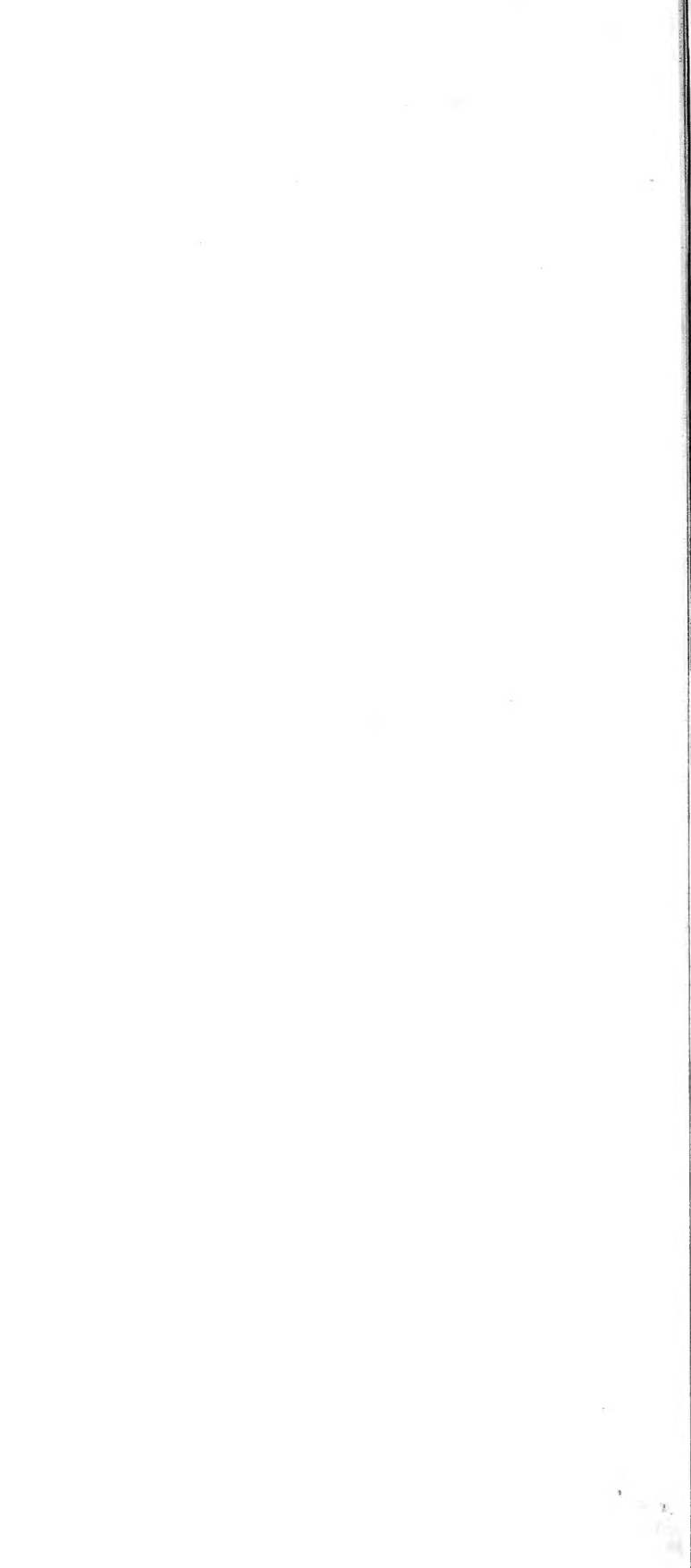


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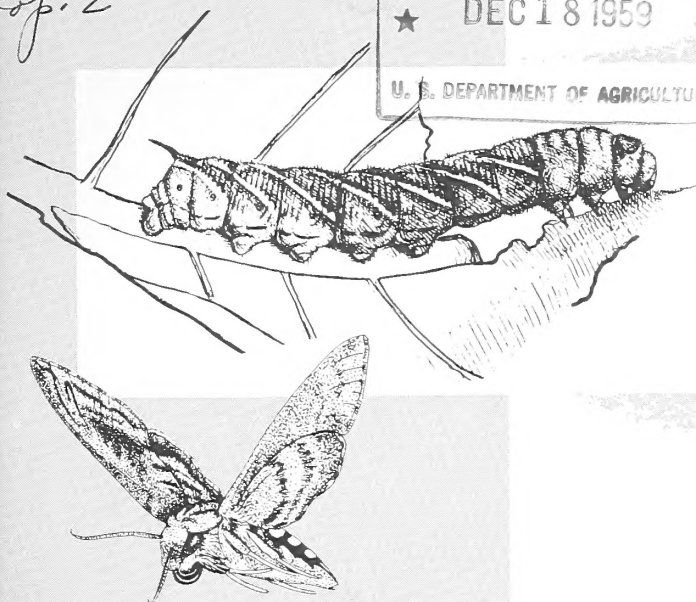


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U. S. DEPARTMENT OF AGRICULTURE



# HORNWORMS on TOBACCO

how to  
control  
them

Leaflet No. 399

U.S. DEPARTMENT OF AGRICULTURE

# HORNWORMS on TOBACCO

## • how to control them

Hornworms are found wherever tobacco is grown. They feed on the leaves of the growing plants, cutting holes that may be 3 or 4 inches across. They can destroy an entire crop if the grower takes no measures to control them.

In the United States hornworms cause more damage to tobacco than any other pest. The damage is estimated at \$80 million annually.

Two species of hornworms occur on tobacco—the tobacco hornworm<sup>1</sup> and the tomato hornworm.<sup>2</sup>

## WHAT THEY LOOK LIKE

Hornworms are the caterpillars, or young of large, brownish-gray moths.

The caterpillars are green (some are brown to black), and 3 to 4 inches long when full grown. They are called hornworms because of the conspicuous hornlike appendage that is found at the end of the body.

The tobacco hornworm has seven diagonal white stripes on each side of the body; the horn is curved and red. The tomato hornworm has eight V-shaped stripes on each side of the body; the horn is straight and black.

## HOW THEY DEVELOP

The hornworms' life stages are as follows: Egg, larva (caterpillar), pupa, and adult (moth).

The female moth lays round, green eggs, principally on the undersides of tobacco leaves. The eggs hatch in about 5 days.

As soon as they are hatched, hornworms begin feeding on the leaves. They continue feeding 2 to 3 weeks. During this time, they molt, or shed their skin, 4 or 5 times. When full grown, the hornworms crawl to the ground, burrow several inches into the soil, and construct cells, in which they transform into pupae.

The pupae are dark-brown, jug shaped, and about 2 inches long. They are a familiar sight in a tobacco field when the soil is being plowed.

The pupal, or resting, stage usually lasts 2 to 4 weeks; then moths emerge from their pupal cases and make their way to the soil surface. The moths do not feed on tobacco leaves, but



Eggs and newly hatched larvae of the tobacco hornworm

instead prefer to suck nectar from the flowers of jimsonweed and tobacco. Their feeding causes no damage to the plants.

The insects pass the winter in the soil as pupae. In May or June, moths emerge and mate, and the females lay their eggs.

Hornworms usually produce 1 to 4 generations a season; the number depends on latitude and weather.

## HOW TO CONTROL THEM

You can control hornworms by following recommended cultural practices, by handpicking, and by applying an insecticide to tobacco plants. Cultural practices and handpicking greatly reduce the need for insecticides.

### Cultural Practices

1. Immediately after harvest plow up or otherwise destroy all stalks remaining in the field. The suckers of these stalks furnish food for a large number of hornworms. *This practice cuts down on insect breeding.*

2. Plow the field in the fall. *This practice kills overwintering pupae.* The field may be seeded to rye or some other suitable cover crop after plowing.

### Handpicking

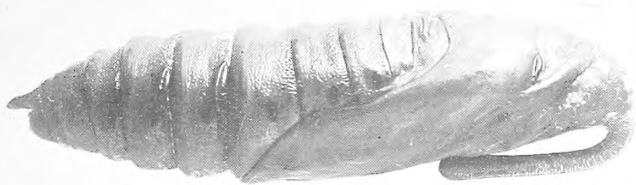
The control of hornworms by handpicking is profitable and should be done whenever practicable.

### Insecticides

You can control hornworms on tobacco by applying endrin or TDE to infested plants. Either insecticide is available from dealers as dust, ready for use, or as emulsifiable concentrates and wettable powders, which can be mixed with water and applied as sprays.

<sup>1</sup> *Protoparce sexta*.

<sup>2</sup> *Protoparce quinquemaculata*.



Pupa of the tobacco hornworm

If you dust, apply 1.5-percent endrin or 10-percent TDE dust at the rate of 8 to 15 pounds per acre for small plants, and 20 to 25 pounds per acre for large plants. Apply with hand or power equipment or by aircraft. If you use aircraft, apply 25 to 30 pounds of dust per acre.

If you spray, mix one of the recommended insecticides with water as follows:

**High-pressure ground sprayer:** Use 1 to 2 pints of a 19.5-percent endrin emulsifiable concentrate, or 2 quarts of a 25-percent TDE emulsifiable concentrate, or 4 pounds of a 50-percent TDE wettable powder with 75 to 100 gallons of water per acre. *Note:* You will need about 75 gallons for small and medium-sized plants; about 100 gallons for large plants.

**Low-pressure ground sprayer:** Use same quantity of endrin or TDE emulsifiable concentrate as recommended above with about 5 gallons of water per acre.

**Aircraft spray equipment:** Use same quantity of endrin or TDE as recommended above with 2 to 5 gallons of water per acre, depending upon the capacity of the equipment.

If you plan to spray with a low-pressure ground sprayer or with aircraft equipment, use an emulsifiable concentrate; a wettable powder may clog the nozzles of these sprayers and also is difficult to keep well mixed with water.

Examine tobacco fields for hornworms when plants are about knee high (or smaller in late-planted fields). Inspect plants carefully to determine the extent of an infestation; hornworms blend in with the foliage and are often difficult to detect.

Make the first application of insecticide when hornworms are too numerous to be controlled easily by handpicking. If you dust, make sure that there is little or no wind. For best results, dust in early morning or late afternoon when the air is more likely to be calm.



Portion of tobacco plant showing severe hornworm damage.

Hornworms on underside of a tobacco leaf



Do not use more insecticide than is recommended. To do so increases the hazard of leaving harmful residues on tobacco and creates an unnecessary expense.

If the pests are still abundant several days after the first application, repeat the treatment. In most fields, 1 or 2 applications are sufficient for hornworm control during a growing season; but in some fields as many as 4 applications may be necessary.

Endrin or TDE can be used to control other tobacco insects. Either insecticide is effective against the tobacco budworms if applied to the young leaves in the buds of the plants. Endrin will control flea beetles and grasshoppers, and partially control aphids.

## OTHER INSECTICIDES MAY REDUCE VALUE OF TOBACCO

Certain insecticides other than endrin and TDE will control hornworms, but growers who use them run the risk of having their crops downgraded or rejected at market because of disagreeable odors or undesirable residues on tobacco.

BHC, toxaphene, and lindane give odors to cured tobacco, and may seriously impair the flavor of cigarettes. Harmful deposits remain on leaves after the application of lead arsenate and paris green. Under some conditions, paris green may injure plants.

When applied according to directions, endrin and TDE—the recommended insecticides—can be used effectively, and will not reduce the value of the tobacco crop.

## NATURAL ENEMIES

Hornworms and other pests of tobacco are preyed upon by beneficial insects such as wasps, flies, and stilt bugs.

A tiny wasp (*Apanteles congregatus*), lays its eggs and completes its development within the hornworm's body cavity. White cocoons of this wasp attached to the backs of hornworms are a familiar sight in tobacco fields.

## PRECAUTIONS

Handle insecticides with care. Heed all precautions prescribed by the manufacturer.

Endrin is extremely poisonous and may be fatal if swallowed, inhaled, or absorbed through the skin. It should be applied only by a person who is thoroughly familiar with its hazards and who will assume full responsibility for safe use and comply with all the precautions on the labels. When workers must handle treated tobacco within 5 days after the application of endrin, they should be protected against skin contact. They should wear rubber gloves and tightly woven clothes.

TDE is less toxic to warmblooded animals than most insecticides when it is used at the dilutions and dosages recommended, and when it is spread thinly on the plants.

This leaflet was prepared by the Entomology Research Division, Agricultural Research Service. It supersedes Leaflet No. 336, Control of Hornworms on Tobacco.

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*Fight Your Insect Enemies*



